

WHAT IS CLAIMED IS

1. An optimization method for power generation cost; the method assuming the mixture rate of alternative fuel and calculating the fuel cost for achieving a target power generation output based on, at least, the fossil fuel price, alternative fuel price, electric power price, and CO<sub>2</sub> emission rights price for trading;

5 calculating the fuel cost in the case of using fossil fuel only; and

10 determining the ratio of mixture of the alternative fuel at which the fuel cost in the case of mixing the alternative fuel is lower than the fuel cost in the case of using the fossil fuel only.

15 2. The optimization method for power generation cost as set forth in Claim 1, wherein the procedure of assuming the mixture rate of the alternative fuel and calculating the fuel cost:

20 forms the zero-order synthesis fuel invest plan that specifies the initial mixture rate of the fossil fuel and alternative fuel;

calculates the fuel cost based on the fossil fuel price, alternative fuel price, electric power price, and CO<sub>2</sub> emission rights price for trading;

judges whether the result of the fuel cost calculation has reached the optimum cost; and,

25 if not yet reached, modifies the nth-order synthesis

fuel invest plan and forms the (n+1)th-order synthesis  
fuel invest plan; and

re-inputs the plan into the calculating procedure;  
and,

5 if the result has reached the optimum cost, outputs  
an operating plan meeting the fuel cost.

3. The optimization method for power generation cost  
as set forth in Claim 1 or 2, wherein the procedure of  
assuming the mixture rate of the alternative fuel and  
10 calculating the fuel cost calculates;

in the case of CO<sub>2</sub> emission rights purchase,

Fuel cost = Alternative fuel consumption × Unit for  
alternative fuel +  
Fossil fuel consumption × Unit for fossil  
15 fuel +  
Emission rights trading displacement ×  
Unit for emission rights trading; and

in the case of CO<sub>2</sub> emission rights sale,

Fuel cost = Alternative fuel consumption × Unit for  
alternative fuel + Fossil fuel  
consumption ×  
Unit for fossil fuel - Emission rights  
trading displacement × Unit for emission  
rights trading

25 4. An optimization system for power generation cost,  
comprising:

a fuel price database for storing, at least, the fossil fuel price, alternative fuel price, electric power price, and CO<sub>2</sub> emission rights price for trading;

planning means for forming the zero-order synthesis fuel invest plan that specifies the initial mixture rate of the fossil fuel and alternative fuel;

calculating means for calculating the fuel cost based on the prices such as fuel prices in the database; and

evaluation method for judging whether the result of the fuel cost calculation has reached the optimum cost, and, if not yet reached, modifying the nth-order synthesis fuel invest plan, forming the (n+1)th-order synthesis fuel invest plan, and re-inputting the plan into the calculating means, and if the result has reached the optimum cost, outputting an operating plan meeting the fuel cost.

5. The optimization system for power generation cost as set forth in Claim 4, wherein

the calculating means includes a means for calculating;

in the case of CO<sub>2</sub> emission rights purchase,

Fuel cost = Alternative fuel consumption × Unit for alternative fuel

+ Fossil fuel consumption × Unit for fossil fuel

25 + Emission rights trading displacement × Unit for emission rights trading; and

in the case of CO<sub>2</sub> emission rights sale,

Fuel cost = Alternative fuel consumption × Unit for alternative fuel

+ Fossil fuel consumption × Unit for fossil fuel

5 - Emission rights trading displacement × Unit for emission rights trading

6. The optimization system for power generation cost as set forth in Claim 4 or 5, wherein

10 calculating, using, as A1, a variable that bases on the change in the efficiency of a power generation plant resulting from the invest of alternative fuel,

Fuel consumption = A1 × Alternative fuel consumption  
+ Fossil fuel consumption

15 7. The optimization system for power generation cost as set forth in any one of Claims 4 to 6, wherein calculating, using, as the basic fuel consumption, the fossil fuel consumption in the case the fuel consumption 20 comprises 100% fossil fuel, and, as K2, a proportional constant that depends upon the special characteristic of a plant,

Basic emission amount = K2 × Basic fuel consumption;

calculating, using, as K3, a proportional constant 25 that depends upon the special characteristic of a plant,

Hazardous substance emission amount reduction = K3 ×

Alternative fuel consumption; and

calculating

Hazardous substance actual emission amount = Basic  
emission amount - Emission amount reduction

5       8. The optimization system for power generation cost  
as set forth in any one of Claims 4 to 7, wherein  
the calculating means includes a means for  
calculating,

10      using, as the emission rights share, the hazardous  
substance emission amount that is permitted under the  
distributed free-of-charge CO<sub>2</sub> emission rights, in the  
case of "actual emission amount > emission rights  
distribution share",

15      Emission rights purchase amount = (Actual emission  
amount - Emission rights distribution share); and, in the  
case of "actual emission amount ≤ emission rights share",

Emission rights purchase amount = 0

9. A support system for generating company,  
comprising a fuel supply company who sells fossil fuel  
20     and alternative fuel, transmission company who sells the  
electric power that is generated using the fossil fuel  
and alternative fuel, and fuel information management  
company, wherein

25     the fuel information management company owns an  
optimization system for power generation cost, comprising  
a fuel price database for storing, at least, the fossil

fuel price, alternative fuel price, electric power price, and CO<sub>2</sub> emission rights price for trading, received from the fuel supply company, planning means for forming the zero-order synthesis fuel invest plan that specifies the  
5 initial mixture rate of the fossil fuel and alternative fuel, calculating means for calculating the fuel cost based on the prices such as fuel prices in the database; and evaluation method for judging whether the result of the fuel cost calculation has reached the optimum cost,  
10 and, if not yet reached, modifying the nth-order synthesis fuel invest plan, forming the (n+1)th-order synthesis fuel invest plan, and re-inputting the plan into the calculating means, and if the result has reached the optimum cost, outputting an operating plan meeting  
15 the fuel cost;

transfers the operating plan to the transmission company, and orders the alternative fuel from the fuel supply company in a volume necessary for the operation at the mixture rate;

20 the fuel supply company delivers the ordered alternative fuel to the transmission company; and

the transmission company generates electric power according to the transferred operating plan, and pays a merit charge for a fuel price curtailment, which is the  
25 fuel cost reduction multiplied by a pre-specified coefficient, to the fuel information management company.

10. The support system for generating company as set forth in Claim 9, wherein the optimization system for power generation cost owned by the fuel information management company comprises a fuel price database for storing, at least, the fossil fuel price, alternative fuel price, electric power price, and CO<sub>2</sub> emission rights price for trading, planning means for forming the zero-order synthesis fuel invest plan that specifies the initial mixture rate of the fossil fuel and alternative fuel, calculating means for calculating the fuel cost based on the prices such as fuel prices in the database; and evaluation method for judging whether the result of the fuel cost calculation has reached the optimum cost, and, if not yet reached, modifying the nth-order synthesis fuel invest plan, forming the (n+1)th-order synthesis fuel invest plan, and re-inputting the plan into the calculating means, and if the result has reached the optimum cost, outputting an operating plan meeting the fuel cost.

20        11. The support system for generating company as set forth in Claim 9 or 10, wherein the optimization system for power generation cost includes a means for calculating, in the case of CO<sub>2</sub> emission rights purchase,

25              Fuel cost = Alternative fuel consumption × Unit for alternative fuel

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+ Fossil fuel consumption × Unit for fossil fuel  
+ Emission rights trading displacement × Unit for  
emission rights trading; and  
calculating, in the case of CO<sub>2</sub> emission rights sale,  
Fuel cost = Alternative fuel consumption × Unit for  
alternative fuel  
+ Fossil fuel consumption × Unit for fossil fuel  
- Emission rights trading displacement × Unit for  
emission rights trading.

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